

REMARKS/ARGUMENTS

Claims 1 to 5 are pending. Applicant has amended claim 1. The amendments to claim 1 find full support in the original specification. Applicant has also amended the specification to correct a typographical error. No new matter is presented. In view of the above amendments and following remarks, Applicant respectfully requests favorable reconsideration and a timely indication of allowance.

The Examiner rejected claims 1 to 3 under 35 U.S.C. § 102(e) as allegedly anticipated by Higashiyama et al. (U.S. Patent No. 6,284,409). Applicant respectfully traverses this rejection.

Claim 1, as amended, recites a negative electrode for a lithium rechargeable battery comprising a carbon material in which lithium intercalation reversibly occurs as a negative active material; and at least one metallic oxide selected from the group consisting of yttrium oxide, cerium oxide, and titanium oxide as an additive.

Higashiyama does not teach or suggest the claimed invention. Higashiyama teaches a hydrogen-absorbing alloy electrode including a hydrogen-absorbing alloy active material and a mixture of graphite and yttrium oxide or a mixture of carbon black and yttrium oxide conductive agent. There are several differences between the present invention and Higashiyama's disclosure.

First, in the present invention, the carbon material acts as an active material, and the metallic oxide acts as an additive. In contrast, in Higashiyama, graphite and carbon and yttrium oxide are all conductive agents.

Additionally, in the present invention, the metallic oxide is used to increase the retention of electrolyte in the negative electrode and increase the diffusion rate of lithium ions. The metallic oxide has a good wettability to a non-aqueous electrode. The good wettability of the metallic oxide leads to improved wettability of the negative electrode and enables easy immersion of the electrolyte into the

negative electrode so that lithium intercalation readily occurs and the charge and discharge efficiency increases. (See page 4, lines 5 to 9 of the specification.)

For all these reasons, Higashiyama does not teach or suggest the claimed invention. Applicant therefore respectfully requests that the rejection over Higashiyama be withdrawn.

The Examiner rejected claims 1 and 5 under 35 U.S.C. § 102(e) as allegedly anticipated by Yoshimura et al. (U.S. Patent No. 6,322,930). Applicant respectfully traverses this rejection.

Yoshimura discloses a negative electrode material comprising metallic lithium, a lithium alloy, a carbon material, or a metal oxide, such as TiO₂. Yoshimura nowhere teaches a negative electrode comprising a mixture of a carbon material and TiO₂ (or yttrium oxide or cerium oxide), as presently claimed. Accordingly, Yoshimura does not anticipate the claimed combination.

To the extent that the Examiner considers claims 1 and 5 obvious in view of Yoshimura, Applicant directs the Examiner to the present specification, which provides evidence of unexpectedly superior results produced by the present invention.

Specifically, Example 3 is directed to a negative electrode comprising a mixture of TiO₂ and natural graphite. Comparative Examples 1 to 4 are directed to mixtures of natural graphite with oxides not within the scope of the claims,¹ and Comparative Example 5 is directed to an electrode comprising only natural graphite. As shown in Table 1 on page 12, and as discussed at page 13, the capacity retention of the cell according to Example 3 was unexpectedly higher than the cell of Comparative Example 5. The unexpected improvement produced by the present invention overcomes any *prima facie* case of obviousness that may be asserted by the Examiner. Applicant therefore respectfully requests that the rejection over Yoshimura be withdrawn.

¹ Although the original specification includes TiO₂ in the list of oxides in Comparative Examples 1 to 4 at page 11, this typographical error is evident from Table 1 on page 12 and has been corrected by an amendment above.

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Reply to Office action of June 24, 2003

The Examiner rejected claims 1 and 5 under 35 U.S.C. § 102(b) as allegedly anticipated by Yufu (JP 57-103724, abstract). Applicant respectfully traverses this rejection.

The Examiner states, based on the abstract, that Yufu teaches a secondary battery comprising a lithium cathode, a nonaqueous electrolyte and an anode made of manganese dioxide, vanadium pentoxide, titanium oxide or the like and carbon powder. Upon obtaining the full text of Yufu, a copy of which is enclosed for the Examiner's reference, Applicant discovered that the English-language abstract erroneously switched the descriptions of the cathode and the anode. Yufu, in fact, discloses a positive electrode comprising manganese dioxide, vanadium pentoxide or titanium oxide with which carbon powder is mixed, and a negative electrode comprising lithium or a lithium alloy.

Accordingly, Yufu does not teach or suggested the claimed negative electrode, and Applicant respectfully requests that the rejection over Yufu be withdrawn.

For all these reasons, Applicant respectfully submits that pending claims 1 to 5, as amended, are in condition for allowance, and a timely indication of allowance is respectfully requested. If there are any remaining issues that can be addressed by telephone, Applicant invites the Examiner to contact the undersigned at the number indicated below.

Respectfully submitted,
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